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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/637,115	08/08/2003	Haijun Yuan	AVA-P007	3827
47389	7590	10/14/2005	EXAMINER	
PATTERSON & SHERIDAN, LLP			VU, PHU	
3040 POST OAK BLVD				
SUITE 1500			ART UNIT	PAPER NUMBER
HOUSTON, TX 77095				2871

DATE MAILED: 10/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/637,115	YUAN ET AL.	
	Examiner	Art Unit	
	Phu Vu	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 18 April 2005.  
 2a) This action is **FINAL**.                            2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-14 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-14 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1.) Certified copies of the priority documents have been received.  
 2.) Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3.) Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1)  Notice of References Cited (PTO-892)  
 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
     Paper No(s)/Mail Date \_\_\_\_\_

4)  Interview Summary (PTO-413)  
     Paper No(s)/Mail Date. \_\_\_\_\_

5)  Notice of Informal Patent Application (PTO-152)  
 6)  Other: \_\_\_\_\_

## **DETAILED ACTION**

1. It is hereby acknowledged that the following papers have been received and placed of record in the file: Remarks (dated 9/28/05)
2. Claims 1-14 is presented for examination.

### ***Response to Arguments***

Applicant's arguments filed 9/28/05 have been fully considered but they are not persuasive. Applicant has argued that the references do not teach the beam waists are located at a substantially center of a liquid crystal cavity in the liquid crystal cavity in the liquid crystal cavity. However, Sorin as cited shows "waveguides" which are preferably liquid crystal (fig. 3 elements 314) which is considered a liquid crystal "cavities." Figure 4 shows an enlarged view where the liquid crystal layer (fig. 4 element 314) is between 2 sets of electrodes (331 and 332) which pass the beam as per figure 3. Furthermore any position that crosses the cavity does meets this limitation as "substantially" implies a range that is not defined in the specification. The limitations of a "beam waist" is interpreted as the beam width as a beam waist is a point where the wavefront is flat. Since the entire beam travels through the liquid crystal cavity than the beam waist travels through the cavity as well.

Applicant has stated that a *prima facie* case of obviousness has not been established do to lack of motivation found in the references see page 7 1<sup>st</sup> paragraph of remarks and furthermore states that the motivation stated in the reference relies on impermissible hindsight however, the motivation cited "to provided an optical switching

element that operates independent of polarization thereby overcoming losses inherent to polarization dependent waveguides" is taught by Sorin see column 1 lines 50-57.

Sorin teaches a light that is split between polarization states prior to transmission of the beam "waists" through liquid crystal waveguides (fig. 3 element 314) that operates on S and P polarized states separately. This invention overcomes losses inherent to polarization dependent waveguides as cited. Since the polarization states are separated and rotated to match states there is no loss due to polarization.

**Regarding claim 3,** the finality of the previous office action has been withdrawn to reject claim 3.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claim 1, 4-5, 7 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juday 6680797 in view of Sorin et al US Patent No. 6208774.**

**Regarding claims 1 and 7,** Juday teaches a spatial light modulator having a polarization beam splitter (cover figure element 10) having a first face and a second face for receiving a collimated beam and separating a beam into orthogonal polarization states. Juday also teaches a waveplate (cover figure element 12) coupled to the second face of the crystal for rotating the polarization beam by 90 degrees thereby

causing the rotated beam to have the same polarization as the other polarization beam and a liquid crystal device for processing the beams.

Juday fails to disclose the P-polarization beam and rotated S-polarization beam are separate from one another and the beam wastes of the P and S beams located at a center of a liquid crystal cavity, however Sorin discloses a liquid crystal cavity that accepts to P and S polarization beams to provide an optical switching element that operates light independent of polarization thereby overcoming losses inherent to polarization dependent waveguides (see cover fig. and column 1 lines 50-57).

Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to separate from one another and the beam wastes of the P and S beams located at a center of a liquid crystal cavity, however Sorin discloses a liquid crystal cavity that accepts to P and S polarization beams to provide an optical switching element that operates of light independent of polarization thereby overcoming losses inherent to polarization dependent waveguides.

**Regarding claim 4**, it is considered inherent to match polarization orientation of a filter to that of the polarizer it is meant to operate with as the beams are rotated to a specific polarization state prior to entering the filter.

**Regarding claim 5** Juday does discloses an optical drain such as a photodetector (see column 3 lines 57-59).

**Regarding claim 11**, Juday discloses a method of using an LC OPM comprising: Separating a collimated beam into a P-polarization and S-polarization beam (fig. 4 element 10); rotating the S-polarization beam by 90 degrees (fig. 4 element 20) and

having the same polarization and scanning to filter the spectral information of the S-polarization beam and P-polarization beam by a liquid crystal tunable filter (fig. 4 element 35).

Juday fails to disclose the P-polarization beam and rotated S-polarization beam are separate from one another and the beam wastes of the P and S beams located at a center of a liquid crystal cavity, however Sorin discloses a liquid crystal cavity that accepts to P and S polarization beams to provide an optical switching element that operates o light independent of polarization thereby overcoming losses inherent to polarization dependent waveguides (see cover fig. and column 1 lines 50-57). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to separate from one another and the beam wastes of the P and S beams located at a center of a liquid crystal cavity, however Sorin discloses a liquid crystal cavity that accepts to P and S polarization beams to provide an optical switching element that operates independent of polarization thereby overcoming losses inherent to polarization dependent waveguides.

**Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Juday in view of Lee et al US Patent 6522467.**

Regarding claim 6, Juday teaches all the limitations of claim 6 except a bi-cell photodiode having a first cell and a second cell, the first cell for receiving the P polarization beam, the second cell of the bi-cell photodiode receiving the rated S-polarization beam. Lee discloses as prior art a LC tunable filter capable or filtering to input signals (see figure 1 element 26). Juday also discloses use of a photodetector as

a means of capturing an output signal. Bi-cell photodetectors are used capturing multiple input sources. It would be obvious to one of ordinary skill in the art to use a bi-cell photodetector having each polarization state going in order reduce processing required to demultiplex the signal. Therefore, at the time of the invention, it would have been obvious to combine Lee's LC tunable filter capable to Juday's invention in order to process multiple inputs separately and also add a bi-cell photo-detector to reduce the need for a means to de-multiplex the output signal.

**Claims 3, 8-10, 12, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juday in view of Chen US PreGrant Publication 2003/0103718.**

**Regarding claims 3, 8, and 12** Juday teaches all the limitations of claim 3 except a beam collimator coupled to the first face of the polarizer, the small beam collimator receiving an input beam and collimating the input beam to become a collimated beam. Chen teaches a collimator coupled to a birefringent crystal having an input beam and emitting a collimated beam (see cover figure element 13). Regarding claim 3 this collimator is considered to have "minimal space separation" between the polarization states. It is well known in the art to collimate light prior to processing it to reduce interference. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to add a collimator to collimate an input beam to reduce interference.

**Regarding claims 9 and 13,** Sorin the matching the alignment of the LC filter in the direction of the liquid crystal (see fig. 4) as the liquid crystal in the filter is aligned as

aligning does not imply any structure as there is no structure set forth without a limitation of exactly how these are aligned.

**Regarding claims 10 and 14,** Judy explicitly discloses all the limitations of the claim except applying a voltage to an LC tunable filter to affect the rotated first beam and second beam. However since LC cells are active devices they require voltage to operate therefore this limitation is inherent to the primary reference.

#### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu Vu whose telephone number is (571)-272-1562. The examiner can normally be reached on 8AM-5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571)-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phu Vu  
Examiner  
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*Andrew Schechter*  
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PRIMARY EXAMINER